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# The Feasibility of Collecting Drug Abuse Data by Telephone

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## Synopsis .....

*An evaluation was made of the use of telephone survey methods to collect illicit drug use data. Using data from a national survey that collects data by personal interviews, marijuana and cocaine use prevalence rates among households with telephones and those without were compared in order to assess coverage errors in telephone surveys. Drug use rates were substantially higher among households without telephones, with 24.9 percent of those living in households without telephones reporting use of marijuana in the past year, com-*

*pared with only 9.4 percent of persons living in households with telephones.*

*Trends in drug use were divergent, with substantial decreases in use occurring between 1985 and 1988 in households with telephones, but not in those without. National prevalence patterns and trends among households with telephones appear to be consistent with national patterns and trends in the total household population, because about 93 percent of the population lives in households with telephones.*

*However, surveys conducted by telephone were found to produce underestimates of illicit drug use prevalence. In a 1988 national telephone survey, estimated rates of past year use were 5.2 percent for marijuana and 1.4 percent for cocaine. Comparable data from a personal visit survey (including only households with telephones and reedited and reweighted to control for differences in data collection protocols) were 8.0 percent for marijuana and 3.1 percent for cocaine use. Comparisons with several other telephone surveys collecting illicit drug use data showed similar results. Based on these results, researchers are advised to use caution in using telephone surveys to produce drug use prevalence estimates.*

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**T**HE INCREASING CONCERN in recent years over the drug abuse problem in the United States has created a need for more data on the nature and extent of drug abuse. Policymakers demand timely, accurate data at the national, State, and local levels to guide them in directing programs and funding toward the goal of reducing drug abuse and to measure progress in these programs.

At the national level, the primary source of data on the prevalence of illicit drug use is the National Household Survey on Drug Abuse (NHSDA), sponsored by the National Institute on Drug Abuse (NIDA). NHSDA is a probability sample survey of U.S. households that employs personal visit interviews with all selected respondents (1). The high cost of conducting household surveys has raised interest in using telephone survey methodology to collect drug use prevalence data. Some States have conducted drug use surveys by telephone and have compared their State results to NHSDA data (2, 3).

Previous research has shown significant differences in the characteristics of those living in households with no telephone, compared to those living in households with telephones. Telephone ownership is less likely in the South and in rural households and among blacks, those younger than 25 years, divorced or separated people, the unemployed, and people with low incomes and educational attainment (2, 4-6). Those living alone or in households of five or more persons also are less likely to own a telephone (6).

Among populations less likely to have telephones, rates of drug use have been found that are both higher and lower than among populations that are likely to own telephones. For example, rates of illicit drug use in the past year in the 1988 NHSDA were highest for the 18-25-year-old age group, and were higher for unemployed than for employed people. Lower rates of use were found the South and rural areas than in other areas of the country (1).

Some studies comparing data from telephone surveys to personal visit surveys have shown that comparable health-related data (7) and sociodemographic data (8) can be obtained from the two methods. However, only a few studies have compared data collected by mode of interview on sensitive issues such as sexual activity or use of illicit drugs. Aquilino and LoSciuto (4) conducted such a comparison based on data collected in New Jersey and concluded that estimates of drug use among whites were similar, regardless of collection mode, but for blacks, telephone-based estimates of marijuana and alcohol were significantly lower than those based on face-to-face interviews.

A study done on a sample of University of Kentucky students showed that personal visit interviews produced larger percentages of persons admitting using illicit drugs than those produced from telephone interviews (9). McQueen (10) conducted a study of sexual behavior related to AIDS and concluded that Computer Assisted Telephone Interviewing (CATI) showed higher rates of sexual activity compared to rates based on face-to-face interviews.

A comparison of characteristics of present and former smokers by mode of interview in a 1979 National Health Interview Survey (NHIS) revealed only small differences (7). Hochstim's discussion of several public health studies indicated that women were more likely to discuss female medical problems or the consumption of alcoholic beverages when responding by mail or telephone rather than by personal visit interview (11). Groves and Kahn (12) reported that respondents in a survey conducted by the University of Michigan were more willing to discuss issues such as income, racial attitudes, and size of income tax return when interviewed face-to-face than by telephone.

Overall, it appears that neither telephone nor personal visit interviewing is clearly superior for soliciting all types of sensitive data. However, the limited amount of research addressing drug use data suggests that personal visit interviewing will provide higher estimates of persons involved in illicit drug use than telephone interviewing.

In 1988, NIDA funded a telephone survey on drug abuse, through a cooperative agreement with the Food and Drug Administration (FDA) using an FDA Quick Response Survey (QRS) contract. The QRS was conducted by Chilton Research Services at about the same time the 1988 NHSDA was in the field. The questions asked in the QRS are comparable to the NHSDA questions, and response rates for the two surveys were similar.

Table 1. QRS and 1988 NHSDA adult respondent sample sizes

Demographic group	Number in QRS sample	NHSDA sample 18 and older <sup>1</sup>	
		Phone	None
Total 18 years and older <sup>2</sup> .....	1,965	5,018	655
Age (years):			
18-25.....	237	1,261	232
26-34.....	415	1,694	278
35 and older.....	1,288	2,063	145
Race or ethnicity:			
White.....	1,533	2,808	206
Black.....	239	949	181
Hispanic.....	101	1,164	251
Sex:			
Male.....	956	2,086	283
Female.....	1,009	2,932	372
Region:			
Northeast.....	...	1,009	98
North Central.....	...	1,010	101
South.....	...	1,791	332
West.....	...	1,208	124
Education:			
Less than high school.....	302	1,360	358
High school graduate.....	695	1,864	231
Some college.....	412	1,006	46
College graduate.....	484	765	18
Personal income:			
Less than \$7,000.....	498	1,752	350
\$7,000-\$14,999.....	300	1,135	191
\$15,000-\$29,999.....	540	1,241	81
\$30,000 or more.....	386	653	12

<sup>1</sup> Presence of telephone was not known for 46 persons.

<sup>2</sup> Demographic group counts in some cases do not sum to the total count because of missing data for some demographic variables.

NOTE: QRS = Quick Response Survey, Food and Drug Administration; NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

We present an analysis of the QRS and NHSDA surveys in an attempt to evaluate the feasibility of using telephone survey methodology to collect data on illicit drug use. In addition, we compare data from a subset of the NHSDA sample in Texas with estimates from a telephone survey conducted in that State in 1988. Comparisons of drug use prevalence rates in households with and without telephones in the NHSDA were made to address the issue of population coverage and the impact of nontelephone households on the measurement of patterns and trends in drug use.

## Methods

**National Household Survey on Drug Abuse.** The NHSDA has been conducted by NIDA periodically since 1971. The 1988 NHSDA was conducted during the fall of 1988 and yielded 3,095 respondents ages 12-17 years and 5,719 respondents aged 18 years and older (table 1), selected from a stratified, multistage area sample of 100 primary sampling

Table 2. Adult respondents' self-reported lifetime and past year use of marijuana and cocaine, by household telephone status and age group, 1988 NHSDA data (percentages)

Drug use and demographic group	Telephone status of household				All	Telephone status of household			
	All	Phone	None	Difference		All	Phone	None	Difference
<b>Lifetime marijuana use</b>					<b>Lifetime cocaine use</b>				
Total	34.9	33.6	54.8	<sup>1</sup> 21.2	11.5	11.0	19.2	<sup>1</sup> 8.2	
<b>Age (years):</b>					<b>Age (years):</b>				
18-25	56.4	55.3	63.1	7.8	19.7	19.5	22.5	3.0	
26-34	62.1	61.3	68.6	<sup>1</sup> 7.3	26.5	26.1	30.4	4.3	
35 and older	19.6	19.1	35.3	<sup>1</sup> 16.2	4.0	3.9	6.0	2.1	
<b>Race or ethnicity:</b>					<b>Race or ethnicity:</b>				
White	35.2	33.8	63.2	<sup>1</sup> 29.4	11.5	11.1	21.1	<sup>1</sup> 10.0	
Black	36.4	34.9	48.3	<sup>1</sup> 13.4	10.5	9.9	14.7	4.8	
Hispanic	29.7	29.1	33.9	4.8	12.0	11.2	17.5	6.3	
<b>Sex:</b>					<b>Sex:</b>				
Male	39.3	37.8	60.5	<sup>1</sup> 22.7	14.3	13.6	22.8	<sup>1</sup> 9.2	
Female	31.0	29.9	48.6	<sup>1</sup> 18.7	9.0	8.6	15.1	<sup>1</sup> 6.5	
<b>Region:</b>					<b>Region:</b>				
Northeast	35.1	35.2	33.9	- 1.4	12.6	12.3	22.7	10.4	
North Central	36.7	34.7	70.7	<sup>1</sup> 36.0	11.8	10.7	30.7	<sup>1</sup> 20.0	
South	31.0	28.7	53.9	<sup>1</sup> 25.2	7.7	7.3	12.5	<sup>1</sup> 5.2	
West	40.1	39.3	53.8	<sup>1</sup> 14.5	17.1	16.7	26.4	9.7	
<b>Past year marijuana use</b>					<b>Past year cocaine use</b>				
Total	10.4	9.4	24.9	<sup>1</sup> 15.5	4.3	4.0	8.7	<sup>1</sup> 4.7	
<b>Age (years):</b>					<b>Age (years):</b>				
18-25	27.9	27.0	34.3	7.3	12.1	11.9	13.7	1.8	
26-34	17.6	16.1	31.4	<sup>1</sup> 15.3	8.0	7.5	12.2	<sup>1</sup> 4.7	
35 and older	3.2	2.9	11.3	8.4	0.9	0.8	1.4	0.6	
<b>Race or ethnicity:</b>					<b>Race or ethnicity:</b>				
White	10.0	9.3	25.7	<sup>1</sup> 16.4	4.0	3.9	7.9	<sup>1</sup> 4.0	
Black	11.0	9.3	22.7	<sup>1</sup> 13.4	4.8	4.6	7.1	2.5	
Hispanic	10.4	9.1	19.2	<sup>1</sup> 10.1	6.0	4.9	13.4	<sup>1</sup> 8.5	
<b>Sex:</b>					<b>Sex:</b>				
Male	13.6	12.5	29.6	<sup>1</sup> 17.1	5.9	5.4	12.0	<sup>1</sup> 6.6	
Female	7.5	6.7	19.8	<sup>1</sup> 13.1	2.8	2.7	5.1	<sup>1</sup> 2.4	
<b>Region:</b>					<b>Region:</b>				
Northeast	9.4	9.2	15.4	6.2	4.3	4.1	11.7	7.6	
North Central	12.9	11.3	40.6	<sup>1</sup> 29.3	5.1	4.5	16.9	<sup>1</sup> 12.4	
South	7.9	6.6	19.6	<sup>1</sup> 13.0	2.7	2.5	5.4	<sup>1</sup> 2.9	
West	13.4	12.3	31.6	<sup>1</sup> 19.3	6.2	6.0	9.0	3.0	

<sup>1</sup> Difference between estimates for households without a telephone and with a telephone is statistically significant at  $\alpha = 0.05$ .

NOTE: NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

units (defined as counties or metropolitan areas). The sample was designed to oversample those younger than 35 years, blacks, and Hispanics.

A total of 33,369 households was selected and screened in order to obtain a specified number of persons of a particular age group, race, and ethnicity in the sample. Solicitation letters were sent to these households in advance of screening. Depending on the age, race, and ethnicity composition of the household, either no one, one, or two persons were selected from each. The 1988 NHSDA achieved a household screening response rate of 93 percent, and interview response rates were 82 percent for those aged 12-17 years and 71 percent for those aged 18 years and older (1).

The NHSDA questionnaire has remained comparable in recent years. It includes questions on the

use of various licit and illicit drugs, as well as a question on the number of nonbusiness telephone numbers in the household, allowing for a comparative analysis of drug use and demographic data by presence of telephone.

The interview procedure includes a combination of open interview techniques and self-administered answer sheet techniques for the sensitive drug use questions in order to maximize confidentiality and response validity. After the household screening process is completed and a respondent is selected, the interview is conducted according to a protocol consisting of an introduction; questions on the subject's use of cigarettes, alcohol, prescription-type drugs, marijuana and hashish, inhalants, cocaine and crack, hallucinogens, and heroin; questions on the subject's drug experience, drug

problems, and opinions about drug use and health; and requests for demographic information. The protocol includes a closing and the interviewer's observations.

Data used to produce prevalence estimates from the NHSDA are based on extensive logical editing and logical imputation to check and correct for inconsistencies in reporting. A statistical imputation procedure replaces missing values with data obtained from similar respondents for whom the information is not lacking to adjust for item nonresponse. Survey weights consisted of the inverse of selection probabilities, nonresponse adjustments, and adjustments to reflect population totals for age, sex, and race or ethnicity groups.

The population totals were obtained from the Current Population Survey and are census-based estimates of the U.S. civilian noninstitutionalized population as of November 1, 1988. The geographic scope of NHSDA is the continental United States; however, the population totals represented the continental United States as well as Alaska and Hawaii.

SESUDAAN, a SAS procedure, was used to generate all estimates and variances from the NHSDA data (13).

**Quick Response Survey.** The QRS was conducted in November and December 1988 and obtained interviews from 1,965 adults ages 18 years and older. The sample was drawn using a random digit dialing (RDD) technique, providing a representative sample of all telephone households in the continental United States. In order to obtain a sufficient number of black respondents in the sample, a subsample of persons was selected from zip codes containing more than half blacks. Table 1 contains distributions of the adult NHSDA and QRS respondent samples. The person with the most recent birthday was selected for interview from each household. The interview was conducted without advance notification to the household (no names and addresses of selected households were known). The estimated response rate from the QRS was 66 percent (14).

The QRS questionnaire was a subset of the NHSDA collection instrument, which was reformatted and programmed into a CATI system. In order to complete the interview as quickly as possible while obtaining the necessary information about drug use, a protocol was used consisting of an introduction; identification of the respondent; questions about the subject's use of marijuana and hashish, and cocaine and crack, and demographic

Table 3. Prevalence of self-reported drug use among adults, by household telephone status, 1985 and 1988 NHSDA data (percentages)

Drug use and telephone status	Prevalence		
	1985	1988	z-value
Total lifetime marijuana use			
use .....	33.2	34.9	1.26
Telephone .....	32.4	33.6	0.86
No telephone .....	44.6	54.8	12.67
Total past year marijuana use			
use .....	14.7	10.4	<sup>1</sup> - 4.70
Telephone .....	13.9	9.4	<sup>1</sup> - 4.83
No telephone .....	25.9	24.9	- 0.27
Total lifetime cocaine use			
use .....	12.0	11.5	- 0.67
Telephone .....	11.8	11.0	- 0.95
No telephone .....	15.7	19.2	1.19
Total past year cocaine use			
use .....	6.6	4.3	<sup>1</sup> - 4.14
Telephone .....	6.3	4.0	<sup>1</sup> - 4.17
No telephone .....	9.2	8.7	- 0.26

<sup>1</sup> Difference between the 1985 and 1988 prevalence estimates is statistically significant at  $\alpha = 0.05$ .

NOTE: Sample sizes for 1985 estimates are 4,920 for households with a telephone and 831 for households without a telephone.

NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

information; a closing; and the interviewer's observations.

Two differences between the QRS and NHSDA protocol are worth noting. First, the NHSDA illicit drug use questions were preceded by questions on use of legal drugs, such as cigarettes, alcohol, and prescription drugs. Second, the NHSDA does not use skip patterns in the administration of the drug use questions. Respondents are required to answer every question; an initial response indicating no drug use does not allow respondents to skip following questions. Inconsistencies in responses were resolved during machine editing. The QRS employed CATI with skip patterns that resulted in some drug use questions not being asked of all respondents.

Prevalence estimates from the QRS were based on weights that incorporated the selection probabilities and an adjustment to 1988 U.S. household population estimates taken from the Current Population Survey, to balance the data by age, race or ethnicity, and sex. The population counts include persons in both households with and without telephones in the continental United States, Alaska, and Hawaii. No nonresponse adjustment was incorporated into the survey weights.

**Texas Survey of Substance Use Among Adults.** The survey was conducted by the Texas Commission on

**Table 4. Prevalence of self-reported drug use among youths ages 12 through 17 years, by household telephone status, 1985 and 1988 NHSDA data (percentages)**

Drug use and telephone status	Prevalence		
	1985	1988	z-value
<b>Total lifetime marijuana use</b>			
Telephone	23.4	17.4	<sup>1</sup> -3.75
No telephone	23.7	17.3	<sup>1</sup> -3.82
<b>Total past year marijuana use</b>			
Telephone	20.4	18.8	-0.38
No telephone	19.7	12.6	<sup>1</sup> -4.79
<b>Total lifetime cocaine use</b>			
Telephone	20.1	12.3	<sup>1</sup> -4.92
No telephone	15.4	15.9	0.15
<b>Total past year cocaine use</b>			
Telephone	4.8	3.4	<sup>1</sup> -2.11
No telephone	5.0	3.3	<sup>1</sup> -2.36
<b>Total lifetime marijuana use</b>			
Telephone	2.4	3.9	0.83
No telephone	4.1	2.9	-1.87
<b>Total past year marijuana use</b>			
Telephone	4.3	2.9	<sup>1</sup> -2.20
No telephone	1.3	3.9	1.52

<sup>1</sup> Difference between 1985 and 1988 prevalence estimates is statistically significant at  $\alpha = 0.05$ .

Note: Sample sizes are 1,967 for households with a telephone and 265 for those without in 1985, and 2,790 for households with a telephone and 282 without in 1988.

NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

Alcohol and Drug Abuse and Texas A&M University's Public Policy Resources Laboratory, with funding provided by the U.S. Department of Education. Data collection took place between March 15 and July 27, 1988. Data were based on telephone interviews with 5,096 adults living in Texas. A completion rate of 85 percent was achieved. The questionnaire used was similar to the NHSDA questionnaire, and included questions on cigarettes, alcohol, and various illicit drugs. The sample was selected using random digit dialing with stratification by ethnicity (blacks, Hispanics, and Anglos), age groups (18-25, 26-34, and 35 or more years), and region of the State. The eight regions were defined by clusters of counties. Four of the regions were the Dallas-Fort Worth, Houston, San Antonio, and Corpus Christi Standard Metropolitan Statistical Areas defined by the Bureau of the Census, while the remaining four regions were the Plains, Border, East, and Central areas of the State.

Regional stratification was accomplished by mapping area code and telephone exchanges onto the counties in which they were found. Age and ethnicity stratification were accomplished by screening households and oversampling rare groups to achieve adequate sample size within strata. Prevalence estimates from the survey were based on weights computed from selection probabilities, with

adjustments that reflect the demographic distribution of the adult population for Texas in 1988.

## Data Analysis

Using the 1988 NHSDA data, comparisons of households with telephones and those without were made to assess the bias resulting from the exclusion of nontelephone households from RDD surveys of drug use. This analysis focused primarily on adults because the QRS included only adults. Table 1 shows sample sizes for these comparisons. Estimates of the use of marijuana or cocaine at any time (lifetime use), as well as use within the past year, by age, race or ethnicity, sex, and region were tabulated and compared. A separate analysis of the youth sample in NHSDA was also done. Standard z-tests for the comparison of means were used to determine statistically significant differences between estimates from households with a telephone and households without.

Using 1985 NHSDA data, differences in trends in reported drug use between telephone and nontelephone households were studied. Before a comparison of QRS and NHSDA estimates was performed, it was necessary to recalculate the NHSDA estimates to account for differences in editing and weighting in the two surveys.

For this study, the NHSDA data were reedited to be consistent with the QRS skip patterns. This was necessary because the published NHSDA estimates were based on complex editing of the data file that reconciles inconsistent responses given by respondents on the self-administered answer sheets. For example, denial of drug use on an initial question could occur while use is admitted on a subsequent question. In this case standard NHSDA editing would usually result in this respondent being considered a user. However, in the QRS this situation could not occur if on the initial question the respondent denied use, since the QRS skip pattern would result in the other question on use never being asked. NHSDA data were also standardized, using the direct method, to population counts from QRS, so that age, race or ethnicity, and sex counts were equal to the QRS distributions. This reweighting was to eliminate any differences in estimates due to adjustments to different population counts.

Differences in reported drug use attributable to mode of data collection were tested using z-tests by comparing QRS estimates to estimates from the NHSDA ages 18 years and older sample living in households with a telephone.

Because the sample design for the NHSDA did

not allow computation of representative estimates for the State of Texas, a comparison of the Texas survey data with NHSDA was done by selecting three metropolitan areas that were primary sampling units selected with certainty in the NHSDA sample, and computing combined weighted estimates from both surveys for those areas. These metropolitan areas were Dallas-Fort Worth, Houston, and San Antonio, which include about 58 percent of the population of Texas. Using population counts from the Texas survey, NHSDA data were reweighted by standardizing using the direct method so that age group by metropolitan area population counts were equal to the Texas survey distributions. NHSDA data were also reedited to correspond to the telephone survey protocol of using skip patterns, as was done for the QRS comparison.

## Results

**Comparison of NHSDA households with and without telephones.** Table 2 compares drug use prevalence estimates for members of households with and without telephones and for adults ages 18 years and older in nontelephone households. Although rates of use are consistently and usually substantially higher for nontelephone households, the small sample of nontelephone households results in lack of statistical significance for some subgroup comparisons. While some differences were not statistically significant, drug use prevalence among the telephone households was generally much lower than that among nontelephone households. Based on the NHSDA sample, about 93.5 percent of the adult household population has a telephone.

Thornberry and Massey (5) reported that estimates of the telephone household population based on data from NHIS have not changed considerably since the early 1980s, and their most recent estimate, for 1986, was 93 percent. The similarity of the NHSDA and NHIS estimates (NHIS estimates are based on an overall response rate of about 95 percent) suggests that response rates for telephone and nontelephone households in the NHSDA were not different. The high percentage of adults with telephones explains why the prevalence rates for telephone households are not very different from rates for the total sample in each demographic subgroup.

Table 3 shows trends in reported drug use for telephone and nontelephone households. The significant declines in reported past year drug use that occurred among adults from 1985 to 1988 appear

Table 5. Prevalence of self-reported drug use among adults in 1988, shown by mode of data collection (percentages)

Drug use	NHSDA published estimates <sup>1</sup>	NHSDA reedited and reweighted <sup>2</sup>	QRS <sup>2</sup>
Lifetime marijuana use.....	34.9	34.4	<sup>3</sup> 25.8
Past year marijuana use.....	10.4	8.0	<sup>3</sup> 5.2
Lifetime cocaine use.....	11.5	11.3	<sup>3</sup> 7.9
Past year cocaine use.....	4.3	3.1	<sup>3</sup> 1.4

<sup>1</sup> Includes households with and without telephone.

<sup>2</sup> Includes only households with telephone.

<sup>3</sup> Differences between NHSDA reedited and reweighted estimates and QRS estimates are statistically significant at  $\alpha = 0.05$ .

NOTE: NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse. QRS = Quick Response Survey, Food and Drug Administration.

Table 6. Prevalence of self-reported lifetime use of marijuana among adults, by mode of data collection and demographic group, for 1988

Demographic group	QRS	NHSDA <sup>1</sup>	z-value
Total.....	25.8	34.4	<sup>2</sup> - 5.85
Age (years):			
18-25.....	34.2	55.1	<sup>2</sup> - 5.69
26-34.....	49.2	61.4	<sup>2</sup> - 3.91
35 or older.....	14.9	19.1	<sup>2</sup> - 2.60
Race or ethnicity:			
White.....	28.0	34.8	<sup>2</sup> - 4.00
Black.....	26.4	35.1	<sup>2</sup> - 2.44
Hispanic.....	9.6	30.0	<sup>2</sup> - 5.62
Sex:			
Male.....	30.1	38.6	<sup>2</sup> - 3.88
Female.....	21.9	30.6	<sup>2</sup> - 4.63
Education:			
Less than high school....	12.2	23.2	<sup>2</sup> - 4.35
High school graduate.....	22.3	33.2	<sup>2</sup> - 4.76
Some college.....	33.6	42.0	<sup>2</sup> - 2.49
College graduate.....	32.1	42.9	<sup>2</sup> - 3.10
Personal income:			
Less than \$7,000.....	19.1	25.5	<sup>2</sup> - 2.74
\$7,000-\$14,999.....	22.4	36.2	<sup>2</sup> - 4.07
\$15,000-\$29,999.....	34.5	42.8	<sup>2</sup> - 2.82
\$30,000 or more.....	31.9	41.4	<sup>2</sup> - 2.83

<sup>1</sup> Based only on households with a telephone, reedited and reweighted.

<sup>2</sup> Difference between QRS and NHSDA estimates is statistically significant at  $\alpha = 0.05$ .

NOTE: QRS = Quick Response Survey, Food and Drug Administration; NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

to have occurred only among households with telephones. However, as was true for the demographic patterns shown in table 2, the telephone sample appears to reflect trends in the total sample reasonably well.

Table 4 shows prevalence rates by telephone status for 12- to 17-year-old persons in 1985 and 1988. As for adults, trends were not consistent for telephone and nontelephone households, but the telephone sample adequately reflected trends in the total sample. Differences in drug use rates between telephone and nontelephone households were not as large as the difference seen for adults, and the 1985

Table 7. Prevalence of self-reported past year marijuana use among adults, by mode of data collection and demographic group, for 1988

Demographic group	QRS	NHSDA <sup>1</sup>	z-value
Total .....	5.2	8.0	<sup>2</sup> -3.39
Age group (in years):			
18-25 .....	13.3	22.9	<sup>2</sup> -3.43
26-34 .....	8.4	13.2	<sup>2</sup> -2.35
35 or older .....	1.4	2.0	-1.04
Race or ethnicity:			
White .....	5.4	7.9	<sup>2</sup> -2.54
Black .....	6.7	7.2	-0.26
Hispanic .....	2.3	7.3	<sup>2</sup> -2.59
Sex:			
Male .....	7.5	10.7	<sup>2</sup> -2.37
Female .....	3.1	5.5	<sup>2</sup> -3.05
Education:			
Less than high school .....	2.7	5.9	<sup>2</sup> -2.52
High school graduate .....	4.1	9.3	<sup>2</sup> -4.32
Some college .....	8.7	8.8	-0.05
College graduate .....	5.2	7.5	-1.40
Personal income:			
Less than \$7,000 .....	6.1	7.5	-1.04
\$7,000-\$14,999 .....	3.5	11.0	<sup>2</sup> -4.02
\$15,000-\$29,999 .....	5.4	8.6	<sup>2</sup> -2.12
\$30,000 or more .....	5.1	6.2	-0.64

<sup>1</sup> Based only on households with a telephone, reedited and reweighted.

<sup>2</sup> Difference between QRS and NHSDA estimates is statistically significant at  $\alpha = 0.05$ .

NOTE: QRS = the Quick Response Survey, Food and Drug Administration; NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

Table 8. Prevalence of self-reported lifetime use of cocaine among adults, by mode of data collection and demographic group, for 1988

Demographic group	QRS	NHSDA <sup>1</sup>	z-value
Total .....	7.9	11.3	<sup>2</sup> -3.81
Age (years):			
18-25 .....	11.0	18.7	<sup>2</sup> -2.84
26-34 .....	19.0	26.2	<sup>2</sup> -2.78
35 or older .....	3.1	3.9	-1.14
Race or ethnicity:			
White .....	8.6	11.4	<sup>2</sup> -2.52
Black .....	7.4	9.8	-1.01
Hispanic .....	3.2	11.4	<sup>2</sup> -3.56
Sex:			
Male .....	9.2	14.1	<sup>2</sup> -3.80
Female .....	6.7	8.7	-1.77
Education:			
Less than high school .....	3.4	6.3	<sup>2</sup> -2.10
High school graduate .....	5.6	10.8	<sup>2</sup> -3.85
Some college .....	12.0	13.4	-0.61
College graduate .....	9.7	16.3	<sup>2</sup> -3.04
Personal income:			
Less than \$7,000 .....	6.4	7.5	-0.76
\$7,000-\$14,999 .....	5.4	12.7	<sup>2</sup> -3.95
\$15,000-\$29,999 .....	12.4	13.9	-0.74
\$30,000 or more .....	8.7	14.5	<sup>2</sup> -2.67

<sup>1</sup> Based only on households with a telephone, reedited and reweighted.

<sup>2</sup> Difference between QRS and NHSDA estimates is statistically significant at  $\alpha = 0.05$ .

NOTE: QRS = Quick Response Survey, Food and Drug Administration; NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

data suggest higher rates of use in telephone households.

**Comparison of QRS and NHSDA telephone households.** After reediting and reweighting to make the two data sets as consistent as possible, the NHSDA estimates from telephone households were compared to estimates from the QRS. In general, the QRS estimates were found to be significantly lower for past year and lifetime use of marijuana and cocaine, compared with NHSDA estimates (table 5). Compared with estimates from the full NHSDA sample of persons ages 18 years and older, including nontelephone households, that employ standard NHSDA editing and weighting, QRS estimates are even more divergent.

Tables 6 through 9 compare QRS estimates to NHSDA reweighted and reedited estimates for various demographic groups. QRS estimates are consistently lower.

Although weighted distributions of the samples by various demographic variables indicate that the QRS sample appears to be biased toward better educated, higher income populations, the fact that QRS estimates remain significantly lower than NHSDA estimates, even when comparing rates within education and income subgroups, suggests that the lower rates are due, in part, to underreporting on the QRS.

**Comparison of NHSDA and Texas survey data.** Differences in drug use rates shown by the NHSDA and the Texas survey were not as large or as consistent as seen in the QRS-NHSDA comparison (table 10). The analysis was restricted by the small sample size in the NHSDA in the three metropolitan areas. The only significant difference was in the rate for lifetime marijuana use, which was higher for NHSDA.

## Discussion

The nontelephone owning population is clearly different from the telephone population, as many previous studies have shown. These new data from the NHSDA show not only that reported drug use is significantly higher among the population of households without telephones, but also that long term changes in reported drug use have been very different in telephone and nontelephone populations. Furthermore, these differences appear to be consistent across geographic regions. Therefore, telephone surveys of drug use with designs similar to the QRS will produce underestimates of use,

with the magnitude of the bias depending on the percentage of the population without telephones and on the differences in drug use prevalence rates between the telephone and nontelephone household populations in the geographic area under study. Nationally, with 93 percent of adults in households with telephones, the coverage bias is small. If no other biases were present, estimates from a telephone household sample frame would be reasonably consistent with estimates from a sample from all households.

Other biases seem to be present in telephone surveys, however, which suggests that they may not be appropriate for collecting drug use data. This study showed considerably lower rates of reported drug use in a national telephone survey (QRS), compared with a personal visit survey (NHSDA). In addition to the previous research (4, 9), the comparison of the NHSDA data to a telephone survey conducted in Texas suggested underreporting of drug use in telephone surveys. Similar results were seen in NHSDA comparisons with other telephone surveys. A New York Times-CBS News poll done by telephone in 1989 found that 28 percent of adults in the country had tried illicit drugs in their lifetime, while the 1988 NHSDA estimated 38 percent (15). A telephone survey of adults in New York State done in 1986 produced an estimate of 9 percent for lifetime cocaine use (16). Data from New York are not available from the NHSDA, but an estimate for cocaine use in the Northeast region in 1985 was 13.9 percent (17).

Factors that may have affected respondents' willingness to admit drug use include the mode of administration (telephone versus personal visit), the mode of response (verbal versus self-administered answer sheets), and the context of the illicit drug use questions (whether or not they were preceded by questions on the use of legal drugs). It cannot be determined from this study which of these factors had the greatest impact. Because it is difficult to use self-administered answer sheets in telephone surveys, it may be irrelevant whether it is the mode of administration or the mode of response that affects reporting. Without unusual data collection procedures that could introduce other biases, such as nonresponse, telephone surveys must rely on open interviews with verbal responses to obtain data. For sensitive questions such as those on illicit drug use, it is likely that people will be more willing to reveal their drug use on a self-administered answer sheet than in a verbal response to an interviewer. Research is being conducted by NIDA to evaluate this factor.

Table 9. Prevalence of self-reported past year cocaine use among adults, by mode of data collection and demographic group, for 1988

Demographic group	QRS	NHSDA <sup>1</sup>	z-value
Total .....	1.4	3.1	<sup>2</sup> - 4.12
Age (years):			
18-25 .....	3.1	9.2	<sup>2</sup> - 3.58
26-34 .....	2.8	5.8	<sup>2</sup> - 2.48
35 or older .....	0.5	0.5	0.00
Race or ethnicity:			
White .....	1.2	3.1	<sup>2</sup> - 6.21
Black .....	2.8	3.3	- 0.38
Hispanic .....	1.7	3.3	- 1.03
Sex:			
Male .....	1.5	4.3	<sup>2</sup> - 4.30
Female .....	1.4	2.1	- 1.47
Education:			
Less than high school ....	0.8	1.8	- 1.54
High school graduate .....	1.1	3.9	<sup>2</sup> - 3.93
Some college .....	2.9	3.1	- 0.18
College graduate .....	0.4	3.3	<sup>2</sup> - 3.84
Personal income:			
Less than \$7,000 .....	2.2	2.2	0.00
\$7,000-\$14,999 .....	0.7	5.1	<sup>2</sup> - 4.15
\$15,000-\$29,999 .....	1.1	3.5	<sup>2</sup> - 3.32
\$30,000 or more .....	1.2	2.5	- 1.47

<sup>1</sup> Based only on households with a telephone, reedited and reweighted.

<sup>2</sup> Difference between QRS and NHSDA estimates is statistically significant at  $\alpha = 0.05$ .

NOTE: QRS = Quick Response Survey, Food and Drug Administration; NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

The contextual factor is a possibility in the QRS-NHSDA comparison, in that QRS respondents may have been more willing to admit their illegal drug use if they had been eased into these sensitive questions using less sensitive questions, such as those on cigarettes, alcohol, and prescription drugs, as is done on the NHSDA. This could also have the negative effect of reduced response rates because of the length of the interview; however, while this contextual issue needs further study, it is unlikely that this difference is the sole factor accounting for the substantial differences in reported drug use in the two surveys. Furthermore, the Texas survey, which did include tobacco and alcohol questions preceding the marijuana questions, had a lower rate of lifetime marijuana use than the NHSDA.

Nonresponse is a potential source of bias that could have affected the results of the comparison of the QRS and NHSDA data. Although the response rate was 66 percent in the QRS and the composite response rate for adults in the NHSDA was also 66 percent (93 percent screening response rate and 71 percent interview response rate), the possibility exists that nonresponse patterns could have been different in the two surveys.

A comparison of weighted distributions of the



Table 10. Prevalence of self-reported drug use among adults in Dallas-Ft. Worth, Houston, and San Antonio in 1988, shown by mode of data collection (percentage)

Drug use	NHSDA reweighted estimates <sup>1</sup> (N = 266)	NHSDA reedited and reweighted <sup>2</sup> (N = 212)	Texas Survey (N = 2,745)
Lifetime marijuana use . . . . .	41.6	42.5	<sup>3</sup> 30.8
Past year marijuana use . . . . .	10.6	6.9	7.0
Lifetime cocaine use . . . . .	11.1	9.7	10.7
Past year cocaine use . . . . .	4.2	2.9	2.3

<sup>1</sup> Includes households with a telephone and those without.

<sup>2</sup> Includes only households with a telephone.

<sup>3</sup> Differences between NHSDA reedited and reweighted estimate and Texas survey estimate is statistically significant at  $\alpha = 0.05$ .

NOTE: NHSDA = National Household Survey on Drug Abuse, National Institute on Drug Abuse.

QRS sample and NHSDA telephone sample (adjusted to the QRS age, race, and sex distribution) by various demographic variables was used to investigate this issue. Marital and work status distributions were similar in the two surveys, but the QRS sample appeared to be slightly biased toward better educated, higher income populations, suggesting higher nonresponse among low income and less educated persons in the QRS compared with the NHSDA. However, this bias was small, and could even be the result of reporting differences for the education and income questions on the two surveys.

As suggested by previous research, respondents may tend to report higher income and education in a telephone interview than in a personal interview (8, 18). In any event, tables 6 through 9 demonstrate that NHSDA estimates of drug use are higher than QRS estimates across all education and income groups.

Because there are differences in national drug use estimates introduced by mode of collection, alternative sampling, data collection, and estimation strategies that can significantly reduce coverage, nonresponse and response error must be used if the telephone is to be the primary source of data collection.

Estimation strategies should be evaluated, such as Thornberry and Massey's research (5) that examined several correlates of telephone coverage and survey items in the 1976 NHIS. They found that the NHIS estimates improved when telephone data were poststratified on income, census region, race, and age. In a 1980 national random digit dialing telephone survey on smoking and health characteristics of the household population, Massey and Botman (19) examined several poststratification estimators and found that coverage and nonre-

sponse error were reduced by forming poststrata on age, sex, race, educational attainment, and census region. In the same study it was demonstrated that the omission of the household nonresponse adjustment will not significantly impact the estimates. Based on the results of an analysis of variance procedure, Thornberry and Massey (6) found family income to be the most important predictor of telephone coverage. The 1988 NHSDA did not collect family income data, but variables such as work status, personal income, and educational attainment from the NHSDA data did exhibit a relatively strong relationship to telephone coverage.

Included in an investigation of alternative sampling and data collection procedures should be the use of the procedure of supplementing RDD samples with nontelephone household personal interviews. In Hochstim's study (11), one of the samples selected involved the use of personal visits to screen the household and obtain a telephone number. This information was used to select a subsample of telephone and nontelephone households.

Response error may be reduced by attempting to conduct personal interviews for selected demographic groups or in geographic areas with a higher likelihood of drug use, regardless of telephone status. To obtain a better understanding of the sources of error in telephone surveys, a study that tests for mode effect while controlling for sample size, response rate, sample characteristics, and the context and administration of questions is recommended.

Until more research in this area is conducted, survey researchers need to be cautious in their application of telephone surveys to produce drug use estimates, and policymakers and other users of data from telephone surveys need to be aware of the apparent underreporting bias present in these data. For surveys of smaller geographic areas such as States or metropolitan areas, regional variation in telephone coverage and drug use prevalence rates in nontelephone households should also be a concern since this study cannot be generalized to local areas.

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## Differences in Hypertension Prevalence Among U.S. Black and White Women of Childbearing Age

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### Synopsis .....

*Hypertension and its sequelae complicate pregnancy and can result in poor perinatal outcomes. Overall, U.S. blacks are more likely to be hypertensive than whites, but the degree to which this is true among women of childbearing age (including teenagers) is unknown. Using data from the second National Health and Nutrition Examination Survey (NHANES II), the authors describe hypertension prevalence rates for 422 black and 2,700 white reproductive-age women.*

*The authors present observed data and also predicted prevalence rates derived by modeling the odds of hypertension using logistic regression statistical techniques. They find that black-white differences in hypertension prevalence are negligible among teenagers, but they are pronounced in the*